Frustrated nanostructures of diblock copolymers under curved confinement

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Diblock copolymers whose morphology in the bulk is dictated by the volume fraction of the components and segmental interactions were confined within nanoscopic cylindrical pores. Since the confining geometry is nonplanar and nanoscopic, the extreme imposed curvature, comparable to molecular dimensions, places significant packing frustration on the chains. When incommensurability between the repeating period of diblock copolymers and the diameter of nanopore is coupled with the curvature, it causes the marked departures from bulk or even thin film behavior. The entropy penalty from the constraints and the curvature of the physical confinement determines unique nanostructures available only with this curved confinement.